

SEQUENCE LISTING

<110> Rioux, Stephane
 Martin, Denis
 Hamel, Josee
 Brodeur, Bernard R.
 Rheault, Patrick
 Droun, Nathalie

<120> POLYPEPTIDES OF STREPTOCOCCUS PYOGENES

<130> 484112.436USPC

<140> 10/568,737

<141> 2004-08-16

<150> PCT/CA2004/001510

<151> 2004-08-16

<150> US 60/495,094

<151> 2003-08-15

<160> 46

<170> PatentIn version 3.3

<210> 1

<211> 537

<212> DNA

<213> Streptococcus pyogenes

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gaaggtttca	aaaaagatct	tgaaatgaag	ggtgtcgggt	accgtgctca	acttcaaggt	300
actaaacttg	tcctttcagt	aggtaaactc	caccaagacg	aagttgaagc	tccagaagga	360
attactttca	ctggttgctaa	cccaacttca	atctcagttg	aaggaatcaa	caaagaagtt	420
gttgggtcaaa	cagctgctta	catccgtagc	ttgcgttcac	cagagcctta	caaaggcaaa	480
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<210> 2

<211> 178

<212> PRT

<213> Streptococcus pyogenes

<400> 2

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<212> DNA
<213> Streptococcus pyogenes
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$\langle 210 \rangle$	4
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<212> PRT

<213> Streptococcus pyogenes

<400> 4

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      20      25      30
Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
      35      40      45
Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
      50      55      60
Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65      70      75      80
Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
      85      90      95
Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
      100     105     110
Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
      115     120     125
Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
      130     135     140
Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145     150     155     160
Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser
      165     170     175
Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala
      180     185     190
Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Thr Thr Glu Lys Gly
      195     200     205
Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val
      210     215     220
Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn
225     230     235     240
Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly
      245     250     255
Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Gly Gln Lys Val
      260     265     270
Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val
      275     280     285
Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly
      290     295     300
Gln Gly Gly Asn Asp Gln Gln Asp Asn Pro Asn Gln Ala Lys Phe Pro
305     310     315     320
Tyr Val Ile Glu Leu Asp Gln Ser Asp Lys Gln Pro Leu Ile Gly Ser
      325     330     335
His Thr Tyr Val Asn Val Leu Asn Asn Val Pro Glu Ala Gly Lys Ile
      340     345     350
Val Leu Lys Glu Thr Phe Thr Met Ala Glu Asn Gly Lys Thr Tyr Val
      355     360     365
Trp Lys Val Asp Lys Asn Lys Val Lys Lys Gln Glu Ile Lys Thr Lys
      370     375     380
Pro Phe Ser Lys Gly Tyr Val Glu Val Thr Ser Gly Leu Thr Met Gln
385     390     395     400

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Gly Ser Ile Val Lys Pro
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<213> Streptococcus pyogenes
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<212>    PRT
<213>  Streptococcus pyogenes
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Leu	Val	Ala	Cys	Val	Asn	Gln	His	Pro	Lys	Thr	Ala	Lys	Glu	Thr	Glu	
			20					25					30			
Gln	Gln	Arg	Ile	Val	Ala	Thr	Ser	Val	Ala	Val	Val	Asp	Ile	Cys	Asp	
		35					40					45				
Arg	Leu	Asn	Leu	Asp	Leu	Val	Gly	Val	Cys	Asp	Ser	Lys	Leu	Tyr	Thr	
	50					55					60					
Leu	Pro	Lys	Arg	Tyr	Asp	Ala	Val	Lys	Arg	Val	Gly	Leu	Pro	Met	Asn	
65				70						75					80	
Pro	Asp	Ile	Glu	Leu	Ile	Ala	Ser	Leu	Lys	Pro	Thr	Trp	Ile	Leu	Ser	
				85					90					95		
Pro	Asn	Ser	Leu	Gln	Glu	Asp	Leu	Glu	Pro	Lys	Tyr	Gln	Lys	Leu	Asp	
			100					105					110			
Thr	Glu	Tyr	Gly	Phe	Leu	Asn	Leu	Arg	Ser	Val	Glu	Gly	Met	Tyr	Gln	
		115					120					125				
Ser	Ile	Asp	Asp	Leu	Gly	Asn	Leu	Phe	Gln	Arg	Gln	Gln	Glu	Ala	Lys	
	130					135					140					
Glu	Leu	Arg	Gln	Gln	Tyr	Gln	Asp	Tyr	Tyr	Arg	Ala	Phe	Gln	Ala	Lys	
145				150						155					160	

Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
 165 170 175
 Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
 180 185 190
 Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
 195 200 205
 Leu Ser Ala Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
 210 215 220
 Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
 225 230 235 240
 Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
 245 250 255
 Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
 260 265 270
 Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
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 His Val Gly Asp His Pro
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<210> 7
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

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34

<210> 8
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

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29

<210> 9
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

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31

<210> 10
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

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<210> 11
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 11
ccttacaaag gcaaaggcat ccgttacgtt ggtga 35

<210> 12
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 12
tcaccaacgt aacggatgcc tttgcctttg taagg 35

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<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 13
tgtgtggttc atatgagcta cttgataatg 30

<210> 14
<211> 29
<212> DNA
<213> Artificial Sequence

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 <223> Oligonucleotide primer

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<220>
 <223> Oligonucleotide primer

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<210> 17
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<210> 18
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

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<210> 19
 <211> 28
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 <220>
 <223> Oligonucleotide primer

 <400> 19
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<210> 20
 <211> 28
 <212> DNA
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 <223> Oligonucleotide primer

 <400> 20
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<210> 21
 <211> 537
 <212> DNA
 <213> Streptococcus pyogenes

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 attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180
 atgaaaacaa tccatggtag aaccctgtgt aacttgaata acatgggtgt aggtgtttct 240
 gaaggtttca aaaaagatct tgaaatgaag ggtgtcgggt accgtgctca acttcaaggt 300
 actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360
 attacktttca ctgttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt 420
 gtttgtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480
 gggatccgtt acgttggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 22
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 <212> PRT
 <213> Streptococcus pyogenes

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 20 25 30
 Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr
 35 40 45

Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile
 50 55 60
 His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser
 65 70 75 80
 Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala
 85 90 95
 Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln
 100 105 110
 Asp Glu Val Glu Ala Pro Glu Gly Ile Thr Phe Thr Val Ala Asn Pro
 115 120 125
 Thr Ser Ile Ser Val Glu Gly Ile Asn Lys Glu Val Val Gly Gln Thr
 130 135 140
 Ala Ala Tyr Ile Arg Ser Leu Arg Ser Pro Glu Pro Tyr Lys Gly Lys
 145 150 155 160
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 165 170 175
 Gly Lys

<210> 23
 <211> 537
 <212> DNA
 <213> Streptococcus pyogenes

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 attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180
 atgaaaacaa tccatggtag aaccctgtgc aacttgaata acatggttgt aggtgtttct 240
 gaaggtttca aaaaagatct tgaaatgaag ggtgtcgggt accgtgctca acttcaagggt 300
 actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360
 attactttca ctgttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt 420
 gttggtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480
 gggatccgtt acgttggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 24
 <211> 178
 <212> PRT
 <213> Streptococcus pyogenes

<400> 24
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 20 25 30
 Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr
 35 40 45
 Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile
 50 55 60
 His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser
 65 70 75 80
 Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala
 85 90 95
 Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln

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<210> 25
<211> 537
<212> DNA
<213> Streptococcus pyogenes
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[illegible]

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<210> 26
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<212> PRT
<213> Streptococcus pyogenes
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			20					25					30		
Leu	Thr	Arg	Glu	Phe	Asn	Lys	Asn	Ile	Glu	Ile	Lys	Val	Glu	Gly	Thr
		35					40					45			
Glu	Ile	Thr	Val	Val	Arg	Pro	Asn	Asp	Ser	Lys	Glu	Met	Lys	Thr	Ile
	50					55					60				
His	Gly	Thr	Thr	Arg	Ala	Asn	Leu	Asn	Asn	Met	Val	Val	Gly	Val	Ser
65				70					75						80
Glu	Gly	Phe	Lys	Lys	Asp	Leu	Glu	Met	Lys	Gly	Val	Gly	Tyr	Arg	Ala
			85					90						95	
Gln	Leu	Gln	Gly	Thr	Lys	Leu	Val	Leu	Ser	Val	Gly	Lys	Ser	His	Gln
			100					105					110		
Asp	Glu	Val	Glu	Ala	Pro	Glu	Gly	Ile	Thr	Phe	Thr	Val	Ala	Asn	Pro
		115					120					125			
Thr	Ser	Ile	Ser	Val	Glu	Gly	Ile	Asn	Lys	Glu	Val	Val	Gly	Gln	Thr
	130					135					140				
Ala	Ala	Tyr	Ile	Arg	Ser	Leu	Arg	Ser	Pro	Glu	Pro	Tyr	Lys	Gly	Lys
145					150					155					160

Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr
 165 170 175

Gly Lys

<210> 27
 <211> 537
 <212> DNA
 <213> Streptococcus pyogenes

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 attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180
 atgaaaacaa tccatggtag aaccctgtgct aacttgaata acatggttgt aggtgtttct 240
 gaaggtttca aaaaagatct tgaaatgaag ggtgtcgggt accgtgctca acttcaaggt 300
 actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360
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 gttggtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480
 gggatccggt acgttgggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 28
 <211> 178
 <212> PRT
 <213> Streptococcus pyogenes

<400> 28
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 Leu Thr Asn Asn Asn Asn Val Ile Thr Val Lys Gly Pro Lys Gly Glu
 20 25 30
 Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr
 35 40 45
 Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile
 50 55 60
 His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser
 65 70 75 80
 Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala
 85 90 95
 Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln
 100 105 110
 Asp Glu Val Glu Ala Pro Glu Gly Ile Thr Phe Thr Val Ala Asn Pro
 115 120 125
 Thr Ser Ile Ser Val Glu Gly Ile Asn Lys Glu Val Val Gly Gln Thr
 130 135 140
 Ala Ala Tyr Ile Arg Ser Leu Arg Ser Pro Glu Pro Tyr Lys Gly Lys
 145 150 155 160
 Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr
 165 170 175

Gly Lys

<210> 29
 <211> 1269
 <212> DNA

<213> Streptococcus pyogenes

<400> 29

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tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat      180
atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaaatcgac      240
tcaagtaaaag gagaagtcaa agaggtcttt gttaaaaaag gcgatgttgt caaagtagga      300
caacccttgt ttagctatga aacgtcacag cggttaacgg ctcaaagttc agaatttgat      360
gttcaaacca aagccaatca gctccaagtt gctaaaacca atgcagcatt gaagtgggaa      420
acctacaatc gcaaggtcaa tgaaatcaac accctaaaat ctcgctacaa cactgcacca      480
gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatccca agcactaagc      540
gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaata      600
gctactgcca caacggaaaa aggtaaaacta gagtatgaca ccgttaagtc agacaccgca      660
ggaaccattg ttagtctaaa tactgatttg ccaaataaat caaaatccaa aaaagaaaaat      720
gaaactttta tggaaattat cgacaaatca aaaatgttag tcaaaggtaa cattagttaa      780
tttgaccgtg acaagttaaa aatcgggtcaa aaagtcgaag tgattgaccg caaagacaac      840
tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc      900
caaggtcaag gccaaaggtg caatgaccaa caagataatc caaaccaagc aaaattccct      960
tatgttattg aacttgacca atcagacaag cagccactca ttggctcaca cacctatggt      1020
aatgtactca acaatgttcc agaagctggc aagatcgat tgaaagaaac ctttacaatg      1080
gcagaaaaatg gaaaaacctt tgtgtggaaa gttgataaaa acaagggtcaa aaaacaagaa      1140
atcaagacta agcccttctc aaaagggttat gttgaggtaa caagtggctt gactatgcaa      1200
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aaaccttaa                                     1269

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<210> 30

<211> 422

<212> PRT

<213> Streptococcus pyogenes

<400> 30

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Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly Ser Tyr Leu Ile Met
20          25          30
Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
35          40          45
Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
50          55          60
Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65          70          75          80
Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
85          90          95
Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
100          105          110
Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
115          120          125
Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
130          135          140
Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145          150          155          160
Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser

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[illegible]

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<210> 31
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<212> DNA
<213> Streptococcus pyogenes
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[illegible]

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caagggtcaag gccaagggtg caatgaccaa caagataatc caaaccaagc aaaattccct      960
tatgttattg aacttgacca atcagacaag cagccactca ttggctcaca cacctatggt      1020
aatgtactca acaatgttcc agaagctggc aagatcgtat tgaaagaaac ctttacaatg      1080
gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaagggtcaa aaaacaagaa      1140
atcaagacta agcccttctc aaaagggttat gttgaggtaa caagtggctt gactatgcaa      1200
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<210> 32
<211> 422
<212> PRT
<213> Streptococcus pyogenes

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20          25          30
Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
35          40          45
Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
50          55          60
Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65          70          75          80
Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
85          90          95
Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
100         105         110
Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
115         120         125
Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
130         135         140
Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145         150         155         160
Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser
165         170         175
Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala
180         185         190
Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Thr Thr Glu Lys Gly
195         200         205
Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val
210         215         220
Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn
225         230         235         240
Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly
245         250         255
Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Gly Gln Lys Val
260         265         270
Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val
275         280         285
Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly

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290		295		300
Gln Gly Gly Asn Asp	Gln Gln Asp Asn Pro	Asn Gln Ala Lys Phe Pro		
305	310	315		320
Tyr Val Ile Glu Leu Asp	Gln Ser Asp Lys Gln	Pro Leu Ile Gly Ser		
	325	330		335
His Thr Tyr Val Asn Val	Leu Asn Asn Val	Pro Glu Ala Gly Lys Ile		
	340	345		350
Val Leu Lys Glu Thr Phe Thr	Met Ala Glu Asn Gly	Lys Thr Tyr Val		
	355	360		365
Trp Lys Val Asp Lys Asn	Lys Val Lys Lys Gln	Glu Ile Lys Thr Lys		
	370	375		380
Pro Phe Ser Lys Gly Tyr	Val Glu Val Thr Ser	Gly Leu Thr Met Gln		
385	390	395		400
Asp Lys Ile Ala Gln Pro	Leu Pro Gly Met Lys	Asp Gly Met Glu Val		
	405	410		415
Gly Ser Ile Val Lys Pro				
	420			

<210> 33
 <211> 1269
 <212> DNA
 <213> Streptococcus pyogenes

<400> 33
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 tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat 180
 atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaatcgac 240
 tcaagtaaaag gagaagtcaa agaggtcttt gtcaaaaaag gcgatgttgt caaagtagga 300
 caacccttgt ttagctatga aacgtcacag cgggttaacgg ctcaaagttc agaatttgat 360
 gttcaaacca aagccaatca actccaagtt gctaaaacca atgcagcatt gaagtgggaa 420
 acctacaatc gcaaggtcaa tgaaatcaac accctaaaat ctcgctacaa cactgcacca 480
 gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatccca agcactaagc 540
 gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaat 600
 gctactgcca caatggaaaa aggtaaacta gagtatgaca ccgttaagtc agacaccgca 660
 ggaaccattg ttagcctaaa tactgatttg ccaaataaat caaatccaa aaaagaaaat 720
 gaaactttta tggaaattat cgacaaatca aaaatgttag tcaaaggtaa catcagtga 780
 tttgaccgtg acaagttaaa aatcgatcaa aaagtcgaag tgattgaccg caaagacaac 840
 tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc 900
 caaggtcaag gccagggtgg caatgaccaa caagacaatc caaaccaagc aaaattccct 960
 tatgttatcg aacttgacca atcagacaag cagccactca ttggctcaca cacctatggt 1020
 aatgtgctca acaatgttcc agaagctggc aagatcgtat tgaaagaaac ctttacaatg 1080
 gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaagggtcaa aaaacaagaa 1140
 atcaagacta agcccttctc aaaaggttat gttgaggtga caagtggctt gactatgcaa 1200
 gataagattg ctgagccgct tcttggcatg aaagacggtg tggaggtagg aagtattggt 1260
 aaaccttaa 1269

<210> 34
 <211> 422
 <212> PRT
 <213> Streptococcus pyogenes

<400> 34

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Ser	Ala	Gly	Val	Leu	Thr	Cys	Val	Val	Gly	Gly	Ser	Tyr	Leu	Ile	Met
			20					25					30		
Asn	His	Gln	Gln	Gln	Glu	Val	Val	Ser	Ser	Val	Asn	Lys	Val	Lys	Ala
		35					40					45			
Leu	Thr	Ile	Lys	Glu	Ala	Met	Glu	Gln	Gly	Lys	Asp	Ile	Ser	Leu	Thr
	50					55					60				
Leu	Ala	Gly	Glu	Val	Thr	Ala	Asn	Asn	Ser	Ser	Lys	Val	Lys	Ile	Asp
65					70					75				80	
Ser	Ser	Lys	Gly	Glu	Val	Lys	Glu	Val	Phe	Val	Lys	Lys	Gly	Asp	Val
				85					90					95	
Val	Lys	Val	Gly	Gln	Pro	Leu	Phe	Ser	Tyr	Glu	Thr	Ser	Gln	Arg	Leu
			100					105					110		
Thr	Ala	Gln	Ser	Ser	Glu	Phe	Asp	Val	Gln	Thr	Lys	Ala	Asn	Gln	Leu
		115					120					125			
Gln	Val	Ala	Lys	Thr	Asn	Ala	Leu	Lys	Trp	Glu	Thr	Tyr	Asn	Arg	
	130					135					140				
Lys	Val	Asn	Glu	Ile	Asn	Thr	Leu	Lys	Ser	Arg	Tyr	Asn	Thr	Ala	Pro
145					150					155					160
Asp	Glu	Ser	Leu	Leu	Glu	Gln	Ile	Arg	Ser	Ala	Glu	Asp	Ser	Val	Ser
				165					170					175	
Gln	Ala	Leu	Ser	Asp	Ala	Lys	Thr	Ala	Asp	Ser	Asp	Val	Lys	Thr	Ala
			180					185					190		
Gln	Ile	Glu	Leu	Asp	Lys	Ala	Asn	Ala	Thr	Ala	Thr	Met	Glu	Lys	Gly
		195					200					205			
Lys	Leu	Glu	Tyr	Asp	Thr	Val	Lys	Ser	Asp	Thr	Ala	Gly	Thr	Ile	Val
	210					215					220				
Ser	Leu	Asn	Thr	Asp	Leu	Pro	Asn	Gln	Ser	Lys	Ser	Lys	Lys	Glu	Asn
225					230					235					240
Glu	Thr	Phe	Met	Glu	Ile	Ile	Asp	Lys	Ser	Lys	Met	Leu	Val	Lys	Gly
				245					250					255	
Asn	Ile	Ser	Glu	Phe	Asp	Arg	Asp	Lys	Leu	Lys	Ile	Asp	Gln	Lys	Val
			260					265					270		
Glu	Val	Ile	Asp	Arg	Lys	Asp	Asn	Ser	Lys	Lys	Trp	Thr	Gly	Lys	Val
		275					280					285			
Thr	Gln	Val	Gly	Asn	Leu	Lys	Ala	Glu	Glu	Lys	Gly	Gln	Gly	Gln	Gly
	290					295					300				
Gln	Gly	Gly	Asn	Asp	Gln	Gln	Asp	Asn	Pro	Asn	Gln	Ala	Lys	Phe	Pro
305					310					315					320
Tyr	Val	Ile	Glu	Leu	Asp	Gln	Ser	Asp	Lys	Gln	Pro	Leu	Ile	Gly	Ser
				325					330					335	
His	Thr	Tyr	Val	Asn	Val	Leu	Asn	Asn	Val	Pro	Glu	Ala	Gly	Lys	Ile
			340					345					350		
Val	Leu	Lys	Glu	Thr	Phe	Thr</									

420

<210> 35
 <211> 1269
 <212> DNA
 <213> Streptococcus pyogenes

<400> 35
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 tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat 180
 atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaaatcgac 240
 tcaagtaaag gagaagtcaa agatgtcttt gtcaaaaaag gcgatgttgt caaagtagga 300
 caacccttgt ttagctatga aacgtcacaa cgggttaacgg ctcaaagttc agaatttgat 360
 gttcaaacca aagccaatca actccaagtt gctaaaacca atgcagcatt gaagtgggaa 420
 acctacaatc gcaaggtcaa tgaaatcaat accctaaaat ctcgctacaa cactgcacca 480
 gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatctca agcactaagc 540
 gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaata 600
 gctactgccg caacggaaaa aggtaaacta gagtatgaca ccgttaagtc agacaccgca 660
 ggaaccattg ttagtctaaa tactgatttg ccaaataaat caaaatccaa aaaagaaaat 720
 gaaactttta tggaaattat cgacaaatca aaaatgttag tcaaaggtaa catcagtga 780
 tttgaccgtg acaagttaaa aatcgatcaa aaagtcgaag tgattgaccg caaagacaac 840
 tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc 900
 caaggtcaag gccaaggtgg caatgaccaa caagataatc caaaccaagc aaaattccct 960
 tatgttatcg aacttgacca atcagacaag cagccactca ttggttcaca cacctatgtt 1020
 aatgtgtctca acaatgttcc agaagctggc aagatcgtat tgaaagaaac ctttacaatg 1080
 gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaagggtcaa aaaacaagaa 1140
 atcaagacta agcccttctc aaaaggttat gttgaggtga caagcggctt gactatgcaa 1200
 gataagattg ctccagccgct tcctggcatg aaagacggta tggaggtagg aagtattgtt 1260
 aaaccttaa 1269

<210> 36
 <211> 422
 <212> PRT
 <213> Streptococcus pyogenes

<400> 36
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 20 25 30
 Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
 35 40 45
 Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
 50 55 60
 Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
 65 70 75 80
 Ser Ser Lys Gly Glu Val Lys Asp Val Phe Val Lys Lys Gly Asp Val
 85 90 95
 Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
 100 105 110
 Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu

	115		120		125
Gln Val Ala Lys Thr Asn	Ala Ala Leu Lys Trp	Glu Thr Tyr Asn Arg			
130	135	140			
Lys Val Asn Glu Ile Asn Thr	Leu Lys Ser Arg Tyr Asn Thr Ala Pro				
145	150	155		160	
Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser					
	165	170		175	
Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala					
	180	185		190	
Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Ala Thr Glu Lys Gly					
	195	200		205	
Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val					
	210	215		220	
Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn					
225	230	235		240	
Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly					
	245	250		255	
Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Asp Gln Lys Val					
	260	265		270	
Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val					
	275	280		285	
Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly					
	290	295		300	
Gln Gly Gly Asn Asp Gln Gln Asp Asn Pro Asn Gln Ala Lys Phe Pro					
305	310	315		320	
Tyr Val Ile Glu Leu Asp Gln Ser Asp Lys Gln Pro Leu Ile Gly Ser					
	325	330		335	
His Thr Tyr Val Asn Val Leu Asn Asn Val Pro Glu Ala Gly Lys Ile					
	340	345		350	
Val Leu Lys Glu Thr Phe Thr Met Ala Glu Asn Gly Lys Thr Tyr Val					
	355	360		365	
Trp Lys Val Asp Lys Asn Lys Val Lys Lys Gln Glu Ile Lys Thr Lys					
	370	375		380	
Pro Phe Ser Lys Gly Tyr Val Glu Val Thr Ser Gly Leu Thr Met Gln					
385	390	395		400	
Asp Lys Ile Ala Gln Pro Leu Pro Gly Met Lys Asp Gly Met Glu Val					
	405	410		415	
Gly Ser Ile Val Lys Pro					
	420				

<210> 37
 <211> 885
 <212> DNA
 <213> Streptococcus pyogenes

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gtaaatcagc accctaaaac ggctaaagag actgaacagc agagaattgt agccacttcg	120
gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggt ttgtgatagt	180
aaattatata cccttcctaa acgctatgat gctgttaagc gtgtgggttt acccatgaat	240
cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta	300
caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatgggttt tttgaactta	360
cgaagtgttg agggcatgta ccagtctatt gatgatttag ggaacctttt ccaacgtcaa	420

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caagaagcaa aagaattgcg ccagcaatac caggactatt atcgtgcttt ccaagctaaa      480
cgcaagggga agaaaaagcc taaagtgcct attccttatgg gcttgccagg tagttatttg      540
gtggcgacga accaatctta tgtagggaat cttttggact tggcagggtgg tgagaatggt      600
tatcagtcag atgagaaaaga atttctatca gttaatcctg aagacatgct agctaaggag      660
cctgacttga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac      720
aaagaatttg ctgaaaatga tattttggaaa catttttacgg cagtcaagga agggaaaagtc      780
tatgatttgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg      840
gacaccttaa cacagctttt tgaccacgtg ggagatcatc cgtaa                        885

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<210> 38

<211> 294

<212> PRT

<213> Streptococcus pyogenes

<400> 38

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Met Ile Lys Arg Cys Lys Gly Ile Gly Leu Val Leu Met Ala Phe Phe
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           20           25           30
Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
           35           40           45
Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
           50           55           60
Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65           70           75           80
Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
           85           90           95
Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
           100          105          110
Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
           115          120          125
Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
           130          135          140
Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
145          150          155          160
Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
           165          170          175
Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
           180          185          190
Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
           195          200          205
Leu Ser Val Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
           210          215          220
Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225          230          235          240
Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
           245          250          255
Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
           260          265          270
Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
           275          280          285
His Val Gly Asp His Pro
           290

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<210> 39
 <211> 885
 <212> DNA
 <213> Streptococcus pyogenes

<400> 39
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 gtaaatacagc accctaaaac ggctaaagag actgaacagc agagaattgt agccacttcg 120
 gttgctgtgg ttgatattctg tgaccgttta aatttagacc tcgttggggg ttgtgatagt 180
 aaattatata cccttcctaa acgctatgat gctgttaagc gtgtggggtt acccatgaat 240
 cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta 300
 caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatgggtt tttgaactta 360
 cgaagtgttg agggcatgta ccagctctatt gatgatttag ggaacctttt ccaacgtcaa 420
 caagaagcaa aagaattgcy ccagcaatac caggactatt atcgtgcttt ccaagctaaa 480
 cgcaagggga agaaaaagcc taaagtgcct attcttatgg gcttgccagg tagttatttg 540
 gtggcgacga accaatctta tgtaggggaat cttttggact tggcaggtgg tgagaatgtt 600
 tatcagtcag atgagaaaaga atttctatca gttaatcctg aagacatgct agctaaggag 660
 cctgacttga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac 720
 aaagaatttg ctgaaaatga tatttggaac cattttacgg cagtcaagga agggaaagtc 780
 tatgatttgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg 840
 gacaccttaa cacagctttt tgaccacgtg ggagatcatc cgtaa 885

<210> 40
 <211> 294
 <212> PRT
 <213> Streptococcus pyogenes

<400> 40
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 20 25 30
 Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
 35 40 45
 Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
 50 55 60
 Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
 65 70 75 80
 Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
 85 90 95
 Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
 100 105 110
 Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
 115 120 125
 Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
 130 135 140
 Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
 145 150 155 160
 Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
 165 170 175
 Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
 180 185 190
 Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe

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      195              200              205
Leu Ser Val Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
  210              215              220
Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
 225              230              235              240
Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
      245              250              255
Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
  260              265              270
Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
  275              280              285
His Val Gly Asp His Pro
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<210> 41
<211> 885
<212> DNA
<213> Streptococcus pyogenes

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<400> 41
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gtgaatcagc accctaaaaac ggctaaaagag actgaacagc agagaattgt agccacttcg      120
gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggg ttgtgatagt      180
aaattatata cccttcctaa acgctatgat gctgttaagc gtgtggggtt acccatgaat      240
cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta      300
caagaagatt tggaaaccaa gtatcaaaaa ttggatactg agtatgggtt tttgaactta      360
cgaagtgttg agggcatgta ccagtccatt gatgatttag ggaacctttt ccaacgtcaa      420
caagaagcaa aagaattgcy ccagcaatac caggactatt atcgtgcttt ccaagctaaa      480
cgtaagggga agaaaaagcc taaagtgctt attcttatgg gcttgccagg tagttatttg      540
gtggcgacga accaatctta tgtagggaat cttttggatt tggcagggtg tgagaatggt      600
tatcagtcag atgagaaaaga atttctatca gctaactctg aagacatgct ggctaaggag      660
cctgatattga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac      720
aaagaatttg ctgaaaatga tatgttgaaa cattttacgg cagtcaagga agggaaagtc      780
tatgatattgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg      840
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<210> 42
<211> 294
<212> PRT
<213> Streptococcus pyogenes

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<400> 42
Met Ile Lys Arg Cys Lys Gly Ile Gly Leu Ala Leu Met Ala Phe Phe
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      20              25              30
Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
      35              40              45
Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
      50              55              60
Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
      65              70              75              80
Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser

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				85					90					95					
Pro	Asn	Ser	Leu	Gln	Glu	Asp	Leu	Glu	Pro	Lys	Tyr	Gln	Lys	Leu	Asp				
			100					105					110						
Thr	Glu	Tyr	Gly	Phe	Leu	Asn	Leu	Arg	Ser	Val	Glu	Gly	Met	Tyr	Gln				
		115					120					125							
Ser	Ile	Asp	Asp	Leu	Gly	Asn	Leu	Phe	Gln	Arg	Gln	Gln	Glu	Ala	Lys				
	130					135					140								
Glu	Leu	Arg	Gln	Gln	Tyr	Gln	Asp	Tyr	Tyr	Arg	Ala	Phe	Gln	Ala	Lys				
145					150					155					160				
Arg	Lys	Gly	Lys	Lys	Lys	Pro	Lys	Val	Leu	Ile	Leu	Met	Gly	Leu	Pro				
			165						170					175					
Gly	Ser	Tyr	Leu	Val	Ala	Thr	Asn	Gln	Ser	Tyr	Val	Gly	Asn	Leu	Leu				
		180						185					190						
Asp	Leu	Ala	Gly	Gly	Glu	Asn	Val	Tyr	Gln	Ser	Asp	Glu	Lys	Glu	Phe				
	195						200					205							
Leu	Ser	Ala	Asn	Pro	Glu	Asp	Met	Leu	Ala	Lys	Glu	Pro	Asp	Leu	Ile				
	210					215					220								
Leu	Arg	Thr	Ala	His	Ala	Ile	Pro	Asp	Lys	Val	Lys	Val	Met	Phe	Asp				
225				230					235						240				
Lys	Glu	Phe	Ala	Glu	Asn	Asp	Ile	Trp	Lys	His	Phe	Thr	Ala	Val	Lys				
			245						250					255					
Glu	Gly	Lys	Val	Tyr	Asp	Leu	Asp	Asn	Thr	Leu	Phe	Gly	Met	Ser	Ala				
		260					265					270							
Lys	Leu	Asn	Tyr	Pro	Glu	Ala	Leu	Asp	Thr	Leu	Thr	Gln	Leu	Phe	Asp				
	275						280					285							
Arg	Val	Gly	Asp	His	Pro														
	290																		

<210> 43

<211> 885

<212> DNA

<213> Streptococcus pyogenes

<400> 43

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gttgctgtgg	ttgatatctg	tgaccgttta	aatttagacc	tcgttggggg	ttgtgatagt	180
aaattatata	cccttcctaa	acgctatgat	gctgttaaagc	gtgtggggtt	acccatgaat	240
cctgatatag	agttgattgc	ttctttgaaa	ccaacttga	ttttgagtcc	caattcttta	300
caagaagatt	tggaacccaa	gtatcaaaaa	ttggatactg	agtatgggtt	tttgaactta	360
cgaagtgttg	agggcatgta	ccagtctatt	gatgatttag	ggaacctttt	ccaacgtcaa	420
caagaagcaa	aagaattgcg	ccagcaatac	caggactatt	atcgtgcttt	ccaagctaaa	480
cgtaagggga	agaaaaagcc	taaagtgcct	attcttatgg	gcttgccagg	tagttatttg	540
gtggcgacga	accaatctta	tgtagggaat	cttttggaact	tggcagggtg	tgagaatgtt	600
tatcagtcag	atgagaaaaga	atttctatca	gttaatcctg	aagacatgct	agctaaggag	660
cctgacttga	ttttacgaac	agctcacgcc	attccagaca	aggtaaaaagt	gatgtttgac	720
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<212> PRT

<213> Streptococcus pyogenes

<400> 44

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Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
           35           40           45
Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
           50           55           60
Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65           70           75           80
Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
           85           90           95
Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
           100          105          110
Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
           115          120          125
Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
           130          135          140
Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
145          150          155          160
Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
           165          170          175
Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
           180          185          190
Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
           195          200          205
Leu Ser Val Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
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Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225          230          235          240
Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
           245          250          255
Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
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His Val Gly Asp His Pro
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<211> 27

<212> PRT

<213> Streptococcus pyogenes

<400> 45

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Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly
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